

**WHAT IS CLAIMED IS:**

1. A method for forming a metal interconnect on a substrate surface, comprising:
  - etching the substrate surface to form one or more features in a first processing chamber disposed about a mainframe;
  - transferring the substrate having the features formed therein without breaking vacuum to a second processing chamber disposed about the mainframe;
  - generating a plasma in a remote plasma source;
  - delivering radicals from the remote plasma source to the second chamber; and
  - cleaning the features on the substrate prior to metallization.
2. The method of claim 1, further comprising depositing a barrier layer on the substrate surface after cleaning the features.
3. The method of claim 2, wherein the barrier layer is deposited using a chemical vapor deposition technique.
4. The method of claim 2, wherein the second chamber is a dedicated clean chamber and the barrier layer is deposited within a third chamber disposed about the mainframe.
5. The method of claim 2, wherein the barrier layer comprises a material selected from the group consisting of titanium, titanium nitride, tantalum, tantalum nitride, and a combination thereof.
6. The method of claim 2, wherein the barrier layer is deposited in the second chamber.

7. The method of claim 1, wherein metallization comprises depositing aluminum, copper or tungsten on the substrate surface.
8. The method of claim 7, wherein the aluminum, copper or tungsten is deposited in a third chamber disposed about the mainframe.
9. The method of claim 7, wherein the aluminum, copper or tungsten is deposited in the second chamber.
10. The method of claim 1, wherein metallization comprises depositing copper on exposed surfaces of the substrate surface.
11. A method for forming a metal interconnect on a substrate surface, comprising:
  - etching the substrate surface to form one or more features in a first processing chamber disposed about a mainframe;
  - transferring the substrate having the features formed therein without breaking vacuum to a second processing chamber disposed about the mainframe;
  - generating a plasma in a remote plasma source, wherein the plasma comprises one or more reactive gases selected from the group consisting of hydrogen, nitrogen, argon, and helium;
  - delivering radicals from the remote plasma source to the second chamber; and
  - cleaning the features on the substrate prior to metallization.
12. The method of claim 11, wherein the plasma comprises a mixture of hydrogen and helium.

PATENT

Attorney Docket No.: AMAT/2286.C2/CPES/DT/PJS

Express Mail No.:EV335477814US

13. The method of claim 11, wherein the plasma comprises hydrogen.
14. The method of claim 11, further comprising depositing a barrier layer on the substrate surface after cleaning the features.
15. The method of claim 14, wherein the barrier layer is deposited using a chemical vapor deposition technique within the second chamber.
16. The method of claim 14, wherein the second chamber is a dedicated clean chamber and the barrier layer is deposited within a third chamber disposed about the mainframe, and wherein the barrier layer comprises a material selected from the group consisting of titanium, titanium nitride, tantalum, tantalum nitride, and a combination thereof.
17. The method of claim 11, wherein metallization comprises depositing aluminum, copper or tungsten on the substrate surface.
18. A method for forming a metal interconnect on a substrate surface, comprising:
  - etching the substrate surface to form one or more features in a first processing chamber disposed about a mainframe;
  - transferring the substrate having the features formed therein without breaking vacuum to a second processing chamber disposed about the mainframe;
  - generating a plasma in a remote plasma source;
  - delivering radicals from the remote plasma source to the second chamber; and
  - cleaning the features on the substrate prior to depositing a barrier layer at least partially within the cleaned features;

PATENT

Attorney Docket No.: AMAT/2286.C2/CPES/DT/PJS

Express Mail No.:EV335477814US

transferring the substrate having the barrier layer deposited thereon without breaking vacuum to a third processing chamber disposed about the mainframe; and

depositing a copper sublayer on the barrier layer prior to filling the features with copper.

19. The method of claim 18, wherein the plasma comprises one or more reactive gases selected from the group consisting of hydrogen, nitrogen, argon, and helium.

20. The method of claim 18, wherein the barrier layer is deposited in a fourth chamber disposed about the mainframe.